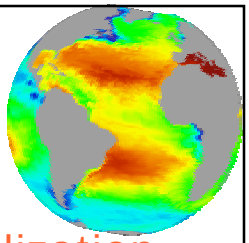

Corridor One

An Integrated Distance Visualization Environment for SSI and ASCI Applications

ANL, LANL, LBNL; EVL, Utah, Princeton

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Presented by

Ian Foster

Argonne National Laboratory

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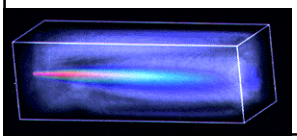
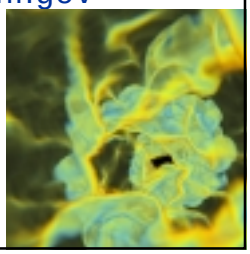




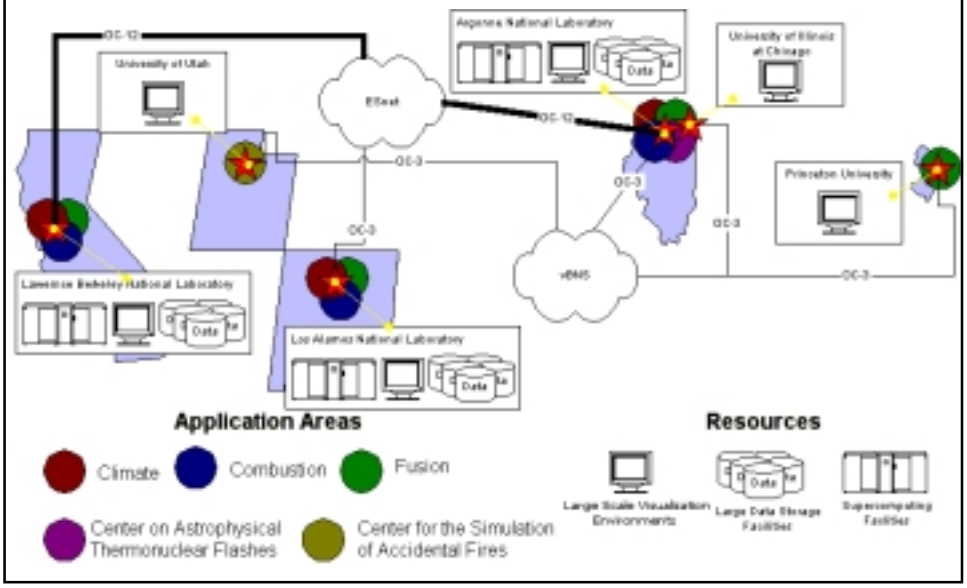
CorridorOne Goals

- Develop & deploy an advanced integrated distance visualization environment
  - Prototype a 6-way multipoint distance visualization corridor, exploiting Grid Fabric
  - Experiment with and deploy advanced visualization technologies
- Demonstrate on applications relevant to the DOE SSI and ASCI programs
  - Focus on remote, high-end vizualization (esp. with advance displays), collaboration

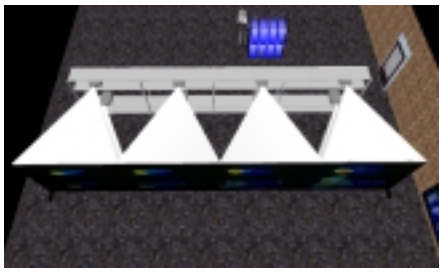
CorridorOne Driving Applications

- ASCI applications datasets
  - Combustion and Thermonuclear Flashes (UIUC, Chicago)
  - ASCI benchmark codes (LANL)
- SSI applications datasets
  - Climate model data (LANL, ANL, LBNL)
  - Fusion device modeling (LANL, Princeton)
  - Combustion modeling data (ANL, LANL)

CorridorOne Testbed



Advanced Display Devices



Why this is an NGI Problem

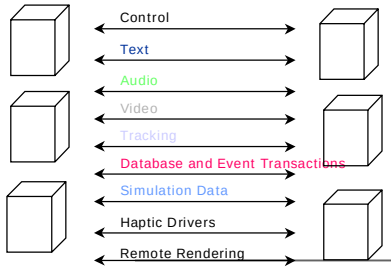
- E.g., users at 4 sites studying 1000 time steps of output from a time-dependent, multi-resolution, billion point simulation
  - Roughly 5 TB in total (10 day run @ 1 TF/s)
- Moving the data is not always an option
  - We need distance visualization, which may require 100-1000+ Mb/s transfer rates
- Collaboration introduces additional flow types: video, audio, tracking
- Computation and data access also integrated

Infrastructure Requirements

- High-speed end-to-end networking to display devices, storage, supercomputers
- Multiple concurrent flows of different types
- Latency and jitter-sensitive flows: video, audio, tracking
- Multicast likely to be required
- Inter-flow correlation probably required
- Advanced Grid services for authentication, resource discovery ("network map"), resource management, instrumentation

Teleimmersion Networking Requirements

Type	Latency	Bandwidth	Reliable	Multicast	Security	treaming	DynQos
Control	*< 30 ms*	64Kb/s	*Yes*	No	*High*	No	Low
Text	*< 100 ms*	64Kb/s	*Yes*	No	Medium	No	Low
Audio	*< 30 ms*	Nx128Kb/s	No	*Yes*	Medium	*Yes*	Medium
Video	*< 100 ms*	Nx5Mb/s	No	*Yes*	Low	*Yes*	Medium
Tracking	*< 10 ms*	Nx128Kb/s	No	*Yes*	Low	*Yes*	Medium
Database	*< 100 ms*	*> 1GB/s*	*Yes*	Maybe	Medium	No	*High*
Simulation	*< 30 ms*	*> 1GB/s*	Mixed	Maybe	Medium	Maybe	*High*
Haptic	*< 10 ms*	> 1 Mb/s	Mixed	Maybe	High	Maybe	*High*
Rendering	*< 30 ms*	*>1GB/s*	No	Maybe	Low	Maybe	Medium



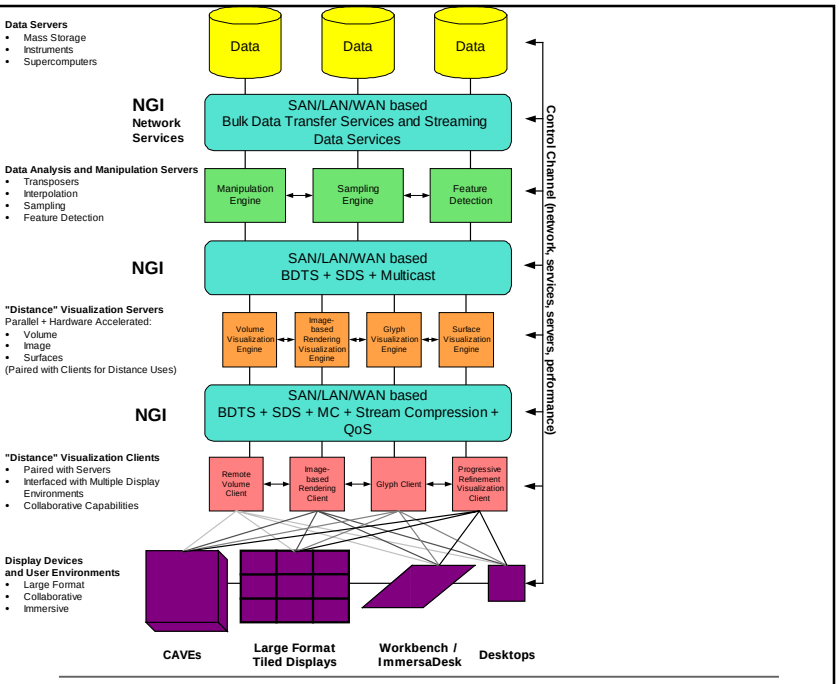
- Immersive environment
- Sharing of objects and virtual space
- Coordinated navigation and discovery
- Interactive control and synchronization
- Interactive modification of environment
- Scalable distribution of environment

Priority Requirements

- High-bandwidth connections to key resources at participating sites
- Quality of service mechanisms for moderate bw (1-15 Mb/s) latency/jitter sensitive flows
- Multicast support
- Grid Services Package deployed
- End-to-end, top-to-bottom instrumentation (incorporated into Grid Services Package)
- Real-time network engineering support during experiments (inc. Princeton, Utah)

Site Network Connectivity

ANL	ESnet, MREN, vBNS
LANL	ESNET, vBNS
LBNL	ESnet, vBNS
EVL	MREN, vBNS
Princeton	vBNS
Utah	vBNS



Corridor One: www.corridorone.org

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